



Workshop

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Welcome

- **Workshop purpose**
 - Improve Chemical Safety and Security
 - We learn status and needs in your country
- Overview of schedule
- Contents of binder/CD
- Other announcements
- Introductions





U.S. DEPARTMENT *of* STATE



The Chemical Security Engagement Program: Improving Best Practices in Chemical Safety and Security

Elizabeth E. Cameron, PhD

Program Director
U.S. Department of State
Office of Cooperative Threat Reduction
Bureau of International Security
& Nonproliferation
(ISN/CTR)





Why? The Global Chemical Threat

- Prevent disasters, protect the public & workers:

- December, 1984: Bhopal, India

- Deter those that seek to:

- Obtain and use chemical weapons;
 - Recruit scientific experts;
 - Use industrial chemicals as low-cost alternatives to conventional attacks.



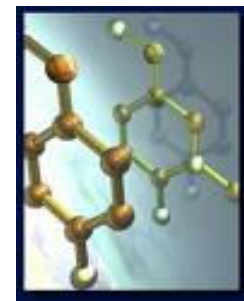


Chemical Security Engagement Program (CSP)



Program Objectives:

- Raise awareness about chemical threat, dual-use nature of chemicals.
- Foster national and regional dialogue.
- Identify chemical safety & security gaps.
- Promote and strengthen scientific collaboration among chemical professionals.
- Provide assistance to improve chemical security and safety best practices.
- **Reduce the chemical threat while promoting beneficial chemical R&D.**





What can be done?

Addressing dual-use can provide dual-benefit:

- Improve occupational health and safety for workers and students.
- Foster dialogue and scientific collaboration among academia and industry worldwide toward peaceful aims.
- Promote safe, secure, sustainable S&T development.





How we do it: Global Chemical Safety & Security Partners

- Work with host countries to assess priorities and gaps in chemical security and safety
- Bring together experts to identify chemical security assistance needs
- Partner with :
 - Host governments
 - International, regional and national professional chemical societies (FACS, IUPAC, etc.)
 - Chemical professionals
 - International efforts to improve chemical safety and security





How CSP will work:



Raise Awareness – Dual use nature of chemicals:

Reducing the chemical threat by collaborating with partner governments and chemical professionals to raise awareness about chemical security and safety, consistent with national and international guidelines, norms and requirements.

Strengthen global scientific cooperation: Providing funding to institutions for projects that advance CSP objectives in chemical safety and security.



Chemical Security Projects in Industry: Working with chemists, chemical engineers and industry representatives in the areas of chemical security and safety, including assistance in risk assessment, safety and security consultations, and design and implementation.

Create training opportunities for scientists, laboratory managers, chemical industry and policy makers on risk/vulnerability assessment and chemical safety to improve chemical security for entities housing, importing or exporting toxic industrial chemicals.





Chemical Security Engagement Program (CSP)



Risks and Gaps Identified:

Universities:

- Lack of safe practices
- Dual use of chemicals
- Improper chemical management
- Improper storage of chemicals
- Lack of enforcement of safety rules/laws

Consequences:

- Injury or death
- Expenses incurred from incidents, spills, disposal
- Loss of trust with community





Chemical Security Engagement Program (CSP)



Risks and Gaps Identified:

Industry:

- Theft of unsecured chemicals
- Improper chemical management
- Improper disposal of chemicals
- Lack of enforcement of safety rules/laws



Consequences:

- Loss of \$\$\$, lower profits, competitor gains
- Injury or death to workers and nearby residents
- Expenses incurred from incidents, spills, disposal
- Loss of trust with community





Chemical Security Engagement Program (CSP)



Course Goal:

- Increase awareness of the importance of chemical safety and security
- Increase knowledge of methods for improving chemical safety and security
- Determine needs for future training/actions

Safety vs. Security:

- Chemical Safety: Protecting people from chemicals
- Chemical Security: Protecting chemicals from people (i.e., terrorists or thieves)

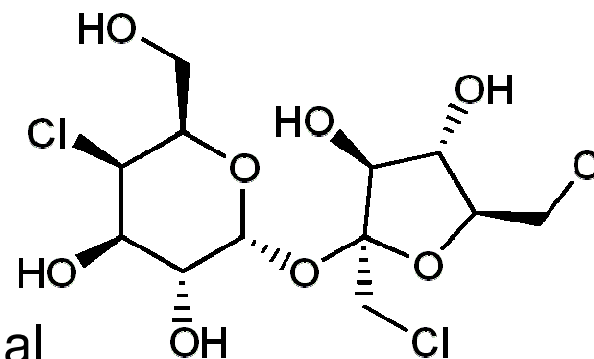




Where CSP will work

Countries with:

- Growing chemistry capabilities
- Growing chemical industry
- Regional security concerns
- Active producers/exporters of industrial chemicals



Regional Approach:

- South and Southeast Asia
- Middle East
- Expanding to other areas





Chemical Security Engagement Program (CSP)

Learn more:

- <http://www.csp-state.net>
- Elizabeth Cameron, PhD
Director, CSP
U.S. Department of State
CameronEE@state.gov
- Carson Kuo
CSP Program Officer
U.S. Department of State
KuoC@state.gov
- Nancy Jackson, PhD
Sandia National Laboratories
nbjacks@sandia.gov
- Pauline Ho, PhD
Sandia National Laboratories
pho@sandia.gov



Chemical Safety and Security Overview

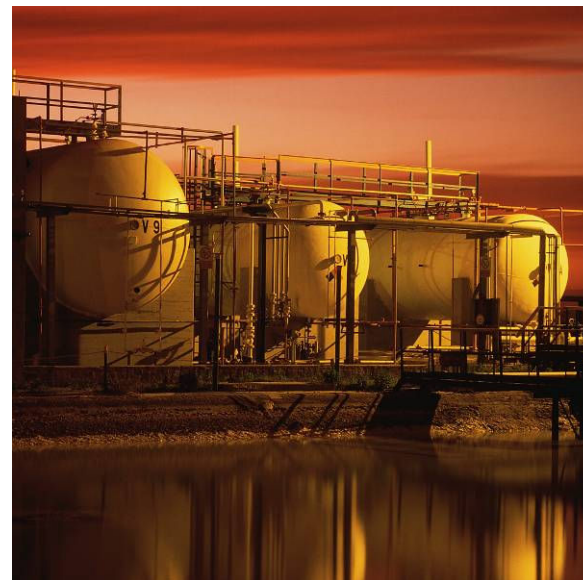
Pauline Ho, PhD

International Chemical Threat Reduction Department
Sandia National Laboratories



Why worry about chemical safety?

- Chemicals used everyday in labs and factories can be hazardous.





Bhopal: Pesticide plant chemical release

- One of the greatest chemical disasters in history, December 1984
- Union Carbide plant making Sevin released ~40 tonnes of methyl isocyanate in the middle of the night
- Low local demand for pesticides meant the plant was only partially running
- Some hardware was broken or turned off, including safety equipment
 - Safety measures and equipment far below US standards
- Plant in heavily populated area
- At least 3800 immediate deaths, 500,000 people exposed
 - 15,000-20,000 premature deaths since
- Large area contaminated
- Many issues still not resolved





Taiwan: Silane fire



- **Motech Industries solar cell plant in Tainan Industrial Park**
 - 1 death
 - US \$1.3 million damage
 - Silane / air explosion
 - Operator responded to gas-cabinet alarm
 - Explosion occurred when he opened gas-cabinet
 - Fire burned for 1 hour before being controlled
 - Caused other SiH_4 and NH_3 cylinders to empty
 - November 2005



University of California Santa Cruz: Fire



- Jan. 11, 2002, ~5:30 am, 4th floor of Sinsheimer Lab building, Dept. of Molecular, Cell and Developmental Biology
 - Firefighters responded to alert from heat-detection system in building
 - Controlled by noon
 - Up-to-date inventory of hazardous materials allowed firefighters to enter building and contain fire
 - Building did not have automatic sprinkler system
- Professors and students lost equipment, notes, materials, samples
- Other labs in building closed for weeks to months
 - Water and smoke damage
- Burned labs took 2 years to reopen
- Cause never determined



Dartmouth College: Dimethylmercury poisoning

- **Karen Wetterhahn, professor and founding director of Dartmouth's Toxic Metals Research Program**
 - expert in the mechanisms of metal toxicity
- **In 1996, spilled a few drops of dimethylmercury on her gloved hand**
 - Cleaned up spill immediately
 - Latex glove believed protective
- **Six months later, became ill and died of acute mercury poisoning at age 48**





Cal. State Univ. Northridge: Earthquake

- Magnitude 6.7, Jan. 17, 1994, 4:31 am
- 57 deaths, 11000 injuries
- Epicenter a few km from California State University Northridge campus

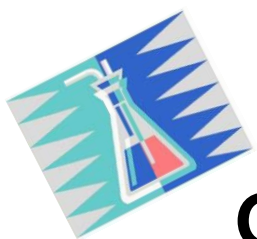


- Several fires in science buildings.
 - Allowed to burn because firemen worried about chemical hazards
- Professors and students lost equipment, notes, materials, samples



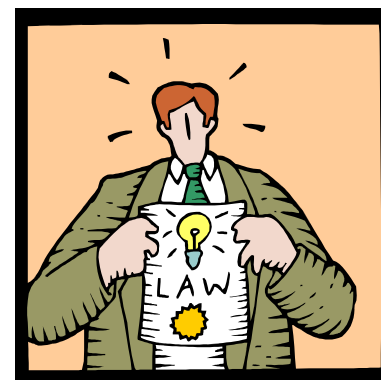
Why worry about chemical safety?

- **Health and safety of scientists**
- **Community relationships**
 - Loss of trust can interfere with how you operate your lab facility
- **Environment**
 - People want clean air, safe food and water
- **Reduce chance of accidental chemical release**
 - Normal operations
 - Abnormal conditions such as earthquakes
- **Avoid loss and damage to labs and equipment**
- **Be safe while doing good science**



Government regulations: Chemical safety

- Will be different from country to country
- US examples:
 - OSHA (Occupational Safety and Health Act)
 - RCRA (Resource Conservation and Recovery Act)
 - TSCA (Toxic Substances Control Act)
 - CAA (Clean Air Act)
 - NEPA (National Environmental Policy Act)
 - Various State-specific regulations
- European Union: REACH
- Your country ?





Why worry about chemical security?

- Long history of people deliberately using chemicals to harm others.
- Information on how to acquire and deliver them is easy to get.





Aum Shinrikyo: Matsumoto and Tokyo, Japan



Photo of wanted poster from Wikipedia commons

- Sarin attack on Judges in Matsumoto, June 1994
 - Sarin sprayed from truck at night
 - 7 deaths, 144 injuries
- Sarin attack on Tokyo subway, March 1995
 - 11 bags with 600 g each on 3 main subway lines
 - 12 deaths, 3938 injuries
- Hydrogen cyanide attacks on Tokyo subway, May 1995
 - Bags of NaCN and sulfuric acid
 - No deaths, 4 injuries
- Recruited young scientists from top Japanese universities
- Produced sarin, tabun, soman, VX
- Purchased tons of chemicals through cult-owned companies
- Motives: proof of religious prophecy, kill opponents, interfere with legal proceedings and police investigations



Chicago, Illinois, USA

- March 2002, an anarchist (called himself “Dr. Chaos”) was found at 2 am in a Univ. Illinois, Chicago, building carrying sodium cyanide
- Had chemicals in a storage room at the Chicago subway
 - included containers marked mercuric sulfate, sodium cyanide, potassium cyanide, and potassium chlorate
 - 0.25 pound of potassium cyanide and 0.9 pound of sodium cyanide
 - stolen from an abandoned warehouse, owned by a Chicago-based chemical company
 - 15 drums and 300 jars of various other laboratory chemicals were discovered there



- Sentenced to prison for “possessing a chemical weapon”, as well as other charges (Interfering with power, air-traffic control systems, computer systems, broadcast systems and setting fires).

<http://cns.miiis.edu/db/wmdt/incidents/1190.htm>,
accessed 12/07



Monkayo, Philippines

- **On 17 December 1999, the Manila Times reported that a battle between the leaders of illegal mining groups in Monkayo, Philippines, involved the use of "poison gas very much like the chemical warfare employed by Saddam Hussein against his enemies in Iraq." The war for control of a gold mining operation in the Mt. Diwalwal area, southeast of Mindanao, Philippines, began on 19 September 1999.**
 - From: Monterey Terrorism Research and Education Program (MonTREP), 460 Pierce Street, Monterey, CA 93940, USA.
<http://cns.miis.edu/db/wmdt/incidents/706.htm>, accessed 12/07
 - Original ref: Fred Reyes, "Cerilles' Disobedience Triggers War in Mining Town," The Manila Times (17 December 1999);
<http://www.manilatimes.net/1999/dec/17/provincial/19991217pro1.html>, originally accessed on 12/18/1999, no longer accessible.



Iraq



- **Many incidents in which chlorine gas cylinders are blown up with explosives**
 - Chlorine probably stolen/diverted from water purification plants or oil industry
 - Many civilians and non-combatants injured
- **Chlorine first used in WWI as a chemical weapon**

On March 23, 2007, police in Ramadi's Jazeera district seized a truck filled with "five 1000-gallon barrels filled with chlorine and more than two tons of explosives"

From http://www.longwarjournal.org/archives/2007/03/al_qaedas_chlorine_w.php downloaded Jan 2008.



Why worry about chemical security?

- Health and safety of people and environment
- Community relationships
- Reduce chance of accidental chemical release
- Avoid loss and damage to labs and equipment
- Prevent criminals and terrorists from getting dangerous chemicals
 - Wide variety of chemicals have been used
 - Wide variety of motivations for actions
- A deliberate attack on a chemical facility could release a large amount of hazardous chemicals
 - Injure or kill people in nearby areas
 - Eliminate jobs and economic assets



Government regulations: Chemical security

- Will be different from country to country
- UN Resolution 1540
- Australia Group
- Other export control legislation

